

CLAIMS

1. A digital data processing apparatus, comprising:
at least one processor, each said at least one processor executing at least one
respective thread of processor-executable instructions, said at least one processor collectively
including:

(a) a plurality of parallel pipelines, each pipeline of said plurality of parallel
pipelines having the capability to perform a set of pre-defined functions on respective
input data; and

(b) control logic controlling the routing of data to said plurality of parallel
pipelines, wherein said control logic, responsive to detection of a failure of a first
pipeline of said plurality of parallel pipelines, causes data intended for processing by
said first pipeline to be processed by a second pipeline of said plurality of parallel
pipelines.

2. The digital data processing apparatus of claim 1, wherein said plurality of parallel
pipelines comprises at least one redundant pipeline.

3. The digital data processing apparatus of claim 2, wherein said plurality of parallel
pipelines comprises N primary pipelines and a single redundant pipeline, said redundant
pipeline providing redundant function in the event of failure of any single one of said N
primary pipelines, where N is greater than 1.

4. The digital data processing apparatus of claim 1, wherein said control logic comprises
selection logic at one or more inputs to each respective pipeline, said selection logic
controlling the selection between a primary source and a secondary source of pipeline data
for the respective pipeline.

1 5. The digital data processing apparatus of claim 4, wherein said selection logic is
2 integrated with operand source selection logic for one or more stages of the respective
3 pipeline.

1 6. The digital data processing apparatus of claim 1, wherein said at least one processor
2 is a plurality of processors, said plurality of processors sharing at least one of said plurality
3 of parallel pipelines.

1 7. The digital data processing apparatus of claim 6, wherein said plurality of processors
2 shares a redundant pipeline of said plurality of parallel pipelines.

1 8. The digital data processing apparatus of claim 1, wherein
2 said plurality of pipelines is arranged in an array;
3 said control logic, responsive to detection of a failure in said first pipeline, causes
4 data intended for processing by said first pipeline to be processed by said second pipeline,
5 said second pipeline being physically adjacent said first pipeline in said array; and
6 said control logic, responsive to detection of a failure in said first pipeline, further
7 causes data intended for processing by said second pipeline to be processed by a third
8 pipeline of said plurality of parallel pipelines, said third pipeline being physically adjacent
9 said second pipeline in said array.

1 9. The digital data processing apparatus of claim 1, wherein said plurality of parallel
2 pipelines perform arithmetic operations on floating point data.

1 10. The digital data processing apparatus of claim 9, wherein said plurality of parallel
2 pipelines perform arithmetic operations on mixed data, including floating point data and
3 fixed point data.

1 11. The digital data processing apparatus of claim 1, further comprising:
2 a plurality of processors;
3 a memory storing instructions for execution on said plurality of processors; and
4 at least one bus coupling said plurality of processors to said memory.

1 12. A processor, comprising:
2 a plurality of parallel pipelines, each pipeline of said plurality of parallel pipelines
3 having the capability to perform a set of pre-defined functions on respective input data, said
4 plurality of parallel pipelines including at least one redundant pipeline; and
5 control logic controlling the routing of data to said plurality of parallel pipelines,
6 wherein said control logic, responsive to detection of a failure of a first pipeline of said
7 plurality of parallel pipelines, causes data intended for processing by said first pipeline to be
8 processed by a second pipeline of said plurality of parallel pipelines.

1 13. The processor of claim 12, wherein said plurality of parallel pipelines comprises N
2 primary pipelines and a single redundant pipeline, said redundant pipeline providing
3 redundant function in the event of failure of any single one of said N primary pipelines,
4 where N is greater than 1.

1 14. The processor of claim 12, wherein said control logic comprises selection logic at one
2 or more inputs to each respective pipeline, said selection logic controlling the selection
3 between a primary source and a secondary source of pipeline data for the respective pipeline.

1 15. The processor of claim 14, wherein said selection logic is integrated with operand
2 source selection logic for one or more stages of the respective pipeline.

1 16. The processor of claim 12, wherein
2 said plurality of pipelines is arranged in an array;

1 said control logic, responsive to detection of a failure in said first pipeline, causes
2 data intended for processing by said first pipeline to be processed by said second pipeline,
3 said second pipeline being physically adjacent said first pipeline in said array; and

4 said control logic, responsive to detection of a failure in said first pipeline, further
5 causes data intended for processing by said second pipeline to be processed by a third
6 pipeline of said plurality of parallel pipelines, said third pipeline being physically adjacent
7 said second pipeline in said array.

1 17. The processor of claim 12, wherein said plurality of parallel pipelines perform
2 arithmetic operations on floating point data.

1 18. The processor of claim 17, wherein said plurality of parallel pipelines perform
2 arithmetic operations on mixed data, including floating point data and fixed point data.